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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,228	08/01/2000	David Alan Burton	TUC920000013US1	6085

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KONRAD RAYNES VICTOR & MANN, LLP
315 SOUTH BEVERLY DRIVE
SUITE 210
BEVERLY HILLS, CA 90212

EXAMINER

ANDERSON, MATTHEW D

ART UNIT PAPER NUMBER

2186

DATE MAILED: 10/27/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/630,228

Applicant(s)

BURTON ET AL.

Examiner

Matthew D. Anderson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6,7,15-18,21,22,30-33,36,37,42 and 43 is/are rejected.
- 7) ☒ Claim(s) 4,5,8-14,19,20,23-29,34,35,38-41 and 44-48 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the current serial number and status of cross-referenced applications should be added on page 1. Appropriate correction is required.

Claim Objections

2. Claims 25-48 are objected to because of the following informalities: Applicant repeated claim number 24, therefore misnumbered claims 24-47 been renumbered 25-48. Applicant is asked to amend the dependencies in these claims due to the renumbering.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 15-17, 30-32, and 42-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheong *et al.* (US Patent # 5,533,189).

5. With respect to claims 1, 16, 31, and 43, Cheong *et al.* disclose:

receiving an update to one or more blocks of customer data at addresses in the storage device, as recited in column 5, line 50, and column 6, lines 55-60;

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for each block of data to update, generating metadata indicating the address of the block in the storage device and an error checking code that is capable of being used to determine whether the customer data in the block has changed, by teaching in column 1, lines 15-20, that each entry contains an address and tag portion including a dirty bit, and in column 5, lines 60-65, of generating an ECC based on the tag bits;

for each block of data to update, writing the block of data to update and the metadata for the block to cache; and for each block of data to update, transferring the block of data and the metadata for the block from the cache to the storage device, by teaching in column 1, lines 30-50, of writing to higher and lower levels of the memory hierarchy.

6. With respect to claims 2, 17, and 32, Cheong *et al.* disclose:

for each block of data to update, determining whether the address of the block of data in the metadata and the address in the storage device match, as recited in column 1, line 40;

for each block of data to update, performing an operation on the customer data in the block, and the error checking code to determine whether the customer data has changed, wherein the block of data to update and metadata for the block is transferred to the storage device if the address of the block in the metadata and requested address match and the customer data has not changed, by teaching in column 1, lines 45-50, of a castout from the cache of non-dirty (dirty bit of zero) data.

7. With respect to claims 15, 30, and 42, Cheong *et al.* disclose the error checking code being further capable of being used to determine whether the metadata in the block has changed, as recited in column 1, line 60 through column 2, line 5.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 3, 6-7, 18, 21-22, 33, and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheong *et al.* (US Patent # 5,533,189) and Wu *et al.* (US Patent # 6,021,482).

10. With respect to claims 3, 6, 18, 21, 33, and 36, Cheong *et al.* teach all other limitations of the parent claims as discussed above, including the XORing of customer data in column 7, line 15, but does not specifically disclose the error checking code comprising a longitudinal redundancy checking code. Wu *et al.* disclose such in column 4, line 26.

11. With respect to claims 7, 22, and 37, Cheong *et al.* teach all other limitations of the parent claims as discussed above, but does not specifically disclose the steps of generating the metadata and determining whether the address of the block in the storage device and block address in metadata match and performing the operation on the customer data and error checking is performed by a device that is separate from a main processor, wherein the device transfers the block of data from the cache to the storage device using a DMA channel. Wu *et al.* teach in figure 2, that the parity checker/generator is separate from the processor, and in column 3, line 66 through column 4, line 5, that DMA operations are used to transfer data between the DRAM and data bus.

12. It would have been obvious to one of ordinary skill in the art, having the teachings of Cheong *et al.* and Wu *et al.* before him at the time the invention was made, to modify the error

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correction taught by Cheong *et al.*, to include a longitudinal redundancy checking code, separate error checking device, and DMA channel, as with the error correction of Wu *et al.*, in order to avoid errors in data transmission, as taught by Wu *et al.*.

Allowable Subject Matter

13. Claims 4-5, 8-14, 19-20, 23-29, 34-35, 38-41, and 44-48 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest the combination of claim elements specifically including the following:

[Claims 4, 8, 19, 23, 34, 38, 44, and 46]: setting up a control block including the address of a first block of data to update in the storage device and an instruction to generate the address and error code as metadata for the block, wherein generating the metadata indicating the address of the block in the storage device comprises using the block address in the control block as the address of the block in the storage device to write as metadata.

[Claims 10, 25, and 40]: recovering from a power loss, and using the metadata for blocks in cache to rebuild cache control blocks for the blocks in cache after recovering from the power loss.

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Conclusion

15. The prior art made of record on form PTO-892 and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111(c) to consider these references fully when responding to this action. The documents cited therein teach similar error correction systems.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew D. Anderson whose telephone number is (703) 306-5931. The examiner can normally be reached on Monday-Friday, 2nd Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (703) 305-3821. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

A handwritten signature in black ink, appearing to read 'Matthew D. Anderson', followed by a long horizontal flourish line.

Matthew D. Anderson
October 7, 2003